



SEQUENCE LISTING

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Kastelein, Robert A.

<120> MAMMALIAN CYTOKINES; RECEPTORS; RELATED REAGENTS AND METHODS

<130> DX01073K

<140> 09/775,046

<141> 2001-02-01

<150> 60/179,638

<151> 2000-02-02

<160> 15

<170> PatentIn version 3.1

<210> 1

<211> 1025

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (58) .. (522)

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| Met Val Leu Ser Gly Ala Leu Cys Phe Arg Met Lys Asp Ser Ala Leu | |
| 1 5 10 15 | |
| aag gtg ctt tat ctg cat aat aac cag ctt cta gct gga ggg ctg cat | 153 |
| Lys Val Leu Tyr Leu His Asn Asn Gln Leu Leu Ala Gly Gly Leu His | |
| 20 25 30 | |
| gca ggg aag gtc att aaa ggt gaa gag atc agc gtg gtc ccc aat cgg | 201 |
| Ala Gly Lys Val Ile Lys Gly Glu Glu Ile Ser Val Val Pro Asn Arg | |
| 35 40 45 | |
| tgg ctg gat gcc agc ctg tcc ccc gtc atc ctg ggt gtc cag ggt gga | 249 |
| Trp Leu Asp Ala Ser Leu Ser Pro Val Ile Leu Gly Val Gln Gly Gly | |
| 50 55 60 | |
| agc cag tgc ctg tca tgt ggg gtg ggg cag gag ccg act cta aca cta | 297 |
| Ser Gln Cys Leu Ser Cys Gly Val Gly Gln Glu Pro Thr Leu Thr Leu | |
| 65 70 75 80 | |
| gag cca gtg aac atc atg gag ctc tat ctt ggt gcc aag gaa tcc aag | 345 |
| Glu Pro Val Asn Ile Met Glu Leu Tyr Leu Gly Ala Lys Glu Ser Lys | |
| 85 90 95 | |
| agc ttc acc ttc tac cgg cgg gac atg ggg ctc acc tcc agc ttc gag | 393 |
| Ser Phe Thr Phe Tyr Arg Arg Asp Met Gly Leu Thr Ser Ser Phe Glu | |

| 100 | 105 | 110 | |
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| tcg gct gcc tac ccg ggc tgg ttc ctg tgc acg gtg cct gaa gcc gat | | | 441 |
| Ser Ala Ala Tyr Pro Gly Trp Phe Leu Cys Thr Val Pro Glu Ala Asp | | | |
| 115 | 120 | 125 | |
| cag cct gtc aga ctc acc cag ctt ccc gag aat ggt ggc tgg aat gcc | | | 489 |
| Gln Pro Val Arg Leu Thr Gln Leu Pro Glu Asn Gly Gly Trp Asn Ala | | | |
| 130 | 135 | 140 | |
| ccc atc aca gac ttc tac ttc cag cag tgt gac tagggcaacg tgccccccag | | | 542 |
| Pro Ile Thr Asp Phe Tyr Phe Gln Gln Cys Asp | | | |
| 145 | 150 | 155 | |
| aactccctgg gcagagccag ctcggtgag ggggtgagtgg aggagacca tggcggacaa | | | 602 |
| tcactctctc tgctctcagg acccccacgt ctgacttagt gggcacctga ccactttgtc | | | 662 |
| ttctggttcc cagtttggat aaattctgag atttgagct cagtccacgg tcctccccca | | | 722 |
| ctggatggtg ctactgctgt ggaaccttgt aaaaaccatg tggggtaaac tgggaataac | | | 782 |
| atgaaaagat ttctgtgggg gtggggtggg gaagtgggtg ggaatcattc ctgcttaatg | | | 842 |
| gtaactgaca agtgttaccc tgagccccgc aggccaaccc atccccagtt gagccttata | | | 902 |
| gggtcagtag ctctccacat gaagtctgt cactcaccac tgtgcaggaa gggaaggtgg | | | 962 |
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|---|
| Lys Val Leu Tyr Leu His Asn Asn Gln Leu Leu Ala Gly Gly Leu His |
| 20 25 30 |

| |
|---|
| Ala Gly Lys Val Ile Lys Gly Glu Glu Ile Ser Val Val Pro Asn Arg |
| 35 40 45 |

| |
|---|
| Trp Leu Asp Ala Ser Leu Ser Pro Val Ile Leu Gly Val Gln Gly Gly |
| 50 55 60 |

| |
|---|
| Ser Gln Cys Leu Ser Cys Gly Val Gly Gln Glu Pro Thr Leu Thr Leu |
| 65 70 75 80 |

Glu Pro Val Asn Ile Met Glu Leu Tyr Leu Gly Ala Lys Glu Ser Lys

85

90

95

Ser Phe Thr Phe Tyr Arg Arg Asp Met Gly Leu Thr Ser Ser Phe Glu
 100 105 110

Ser Ala Ala Tyr Pro Gly Trp Phe Leu Cys Thr Val Pro Glu Ala Asp
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Gln Pro Val Arg Leu Thr Gln Leu Pro Glu Asn Gly Gly Trp Asn Ala
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Pro Ile Thr Asp Phe Tyr Phe Gln Gln Cys Asp
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 Met Arg Gly Thr Pro Gly Asp Ala Asp Gly Gly Gly Arg Ala
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 gtc tat caa tca atg tgt aaa cct att act ggg act att aat gat ttg 156
 Val Tyr Gln Ser Met Cys Lys Pro Ile Thr Gly Thr Ile Asn Asp Leu
 15 20 25 30
 aat cag caa gtg tgg acc ctt cag ggt cag aac ctt gtg gca gtt cca 204
 Asn Gln Gln Val Trp Thr Leu Gln Gly Gln Asn Leu Val Ala Val Pro
 35 40 45
 cga agt gac agt gtg acc cca gtc act gtt gct gtt atc aca tgc aag 252
 Arg Ser Asp Ser Val Thr Pro Val Thr Val Ala Val Ile Thr Cys Lys
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 tat cca gag gct ctt gag caa ggc aga ggg gat ccc att tat ttg gga 300
 Tyr Pro Glu Ala Leu Glu Gln Gly Arg Gly Asp Pro Ile Tyr Leu Gly
 65 70 75
 atc cag aat cca gaa atg tgt ttg tat tgt gag aag gtt gga gaa cag 348
 Ile Gln Asn Pro Glu Met Cys Leu Tyr Cys Glu Lys Val Gly Glu Gln
 80 85 90
 ccc aca ttg cag cta aaa gag cag aag atc atg gat ctg tat ggc caa 396
 Pro Thr Leu Gln Leu Lys Glu Gln Lys Ile Met Asp Leu Tyr Gly Gln
 95 100 105 110

ccc gag ccc gtg aaa ccc ttc ctt ttc tac cgt gcc aag act ggt agg 444
 Pro Glu Pro Val Lys Pro Phe Leu Phe Tyr Arg Ala Lys Thr Gly Arg
 115 120 125

acc tcc acc ctt gag tct gtg gcc ttc ccg gac tgg ttc att gcc tcc 492
 Thr Ser Thr Leu Glu Ser Val Ala Phe Pro Asp Trp Phe Ile Ala Ser
 130 135 140

tcc aag aga gac cag ccc atc att ctg act tca gaa ctt ggg aag tca 540
 Ser Lys Arg Asp Gln Pro Ile Ile Leu Thr Ser Glu Leu Gly Lys Ser
 145 150 155

tac aac act gcc ttt gaa tta aat ata aat gac tgaactcagc ctagagggtg 593
 Tyr Asn Thr Ala Phe Glu Leu Asn Ile Asn Asp
 160 165

cagcttggtc tttgtcttaa agtttctggt tcccaatgtg ttttcgtcta cattttctta 653

gtgtcatttt cacgctggtg ctgagacagg ggcaaggctg ctgttatcat ctcattttat 713

aatgaagaag aagcaattac ttcataagcaa ctgaagaaca ggatgtggcc tcagaagcag 773

gagagctggg tggataaagg ctgtcctctc aagctggtgc tgtgtaggcc acaaggcatc 833

tgcatgagtg actttaagac tcaaagacca aacactgagc tttcttctag ggggtgggtat 893

gaagatgctt cagagctcat gcgcgttacc cacgatggca tgactagcac agagctgatc 953

tctgtttctg ttttgcttta ttccctcttg ggatgatatc atccagtctt tatatgttgc 1013

caatatacct cattgtgtgt aatagaacct tcttagcatt aagaccttgt aaacaaaaat 1073

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Gln Ser Met Cys Lys Pro Ile Thr Gly Thr Ile Asn Asp Leu Asn Gln
 20 25 30

Gln Val Trp Thr Leu Gln Gly Gln Asn Leu Val Ala Val Pro Arg Ser
 35 40 45

Asp Ser Val Thr Pro Val Thr Val Ala Val Ile Thr Cys Lys Tyr Pro
 50 55 60

Glu Ala Leu Glu Gln Gly Arg Gly Asp Pro Ile Tyr Leu Gly Ile Gln
 65 70 75 80

Asn Pro Glu Met Cys Leu Tyr Cys Glu Lys Val Gly Glu Gln Pro Thr

85

90

95

Leu Gln Leu Lys Glu Gln Lys Ile Met Asp Leu Tyr Gly Gln Pro Glu
 100 105 110

Pro Val Lys Pro Phe Leu Phe Tyr Arg Ala Lys Thr Gly Arg Thr Ser
 115 120 125

Thr Leu Glu Ser Val Ala Phe Pro Asp Trp Phe Ile Ala Ser Ser Lys
 130 135 140

Arg Asp Gln Pro Ile Ile Leu Thr Ser Glu Leu Gly Lys Ser Tyr Asn
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Thr Ala Phe Glu Leu Asn Ile Asn Asp
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Met Arg Ile Ile Lys Tyr Glu Phe Ile Leu Asn Asp Ala Leu Asn Gln
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Ser Ile Ile Arg Ala Asn Asp Gln Tyr Leu Thr Ala Ala Ala Leu His
 20 25 30

Asn Leu Asp Glu Ala Val Lys Phe Asp Met Gly Ala Tyr Lys Ser Ser
 35 40 45

Lys Asp Asp Ala Lys Ile Thr Val Ile Leu Arg Ile Ser Lys Thr Gln
 50 55 60

Leu Tyr Val Thr Ala Gln Asp Glu Asp Gln Pro Val Leu Leu Lys Glu
 65 70 75 80

Met Pro Glu Ile Pro Lys Thr Ile Thr Gly Ser Glu Thr Asn Leu Leu
 85 90 95

Phe Phe Trp Glu Thr His Gly Thr Lys Asn Tyr Phe Thr Ser Val Ala
 100 105 110

His Pro Asn Leu Phe Ile Ala Thr Lys Gln Asp Tyr Trp Val Cys Leu
 115 120 125

Ala Gly Gly Pro Pro Ser Ile Thr Asp Phe Gln Ile Leu Glu Asn Gln
130 135 140

Ala
145

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Ala Pro Val Arg Ser Leu Asn Cys Thr Leu Arg Asp Ser Gln Gln Lys
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Ser Leu Val Met Ser Gly Pro Tyr Glu Leu Lys Ala Leu His Leu Gln
20 25 30

Gly Gln Asp Met Glu Gln Gln Val Val Phe Ser Met Ser Phe Val Gln
35 40 45

Gly Glu Glu Ser Asn Asp Lys Ile Pro Val Ala Leu Gly Leu Lys Glu
50 55 60

Lys Asn Leu Tyr Leu Ser Cys Val Leu Lys Asp Asp Lys Pro Thr Leu
65 70 75 80

Gln Leu Glu Ser Val Asp Pro Lys Asn Tyr Pro Lys Lys Lys Met Glu
85 90 95

Lys Arg Phe Val Phe Asn Lys Ile Glu Ile Asn Asn Lys Leu Glu Phe
100 105 110

Glu Ser Ala Gln Phe Pro Asn Trp Tyr Ile Ser Thr Ser Gln Ala Glu
115 120 125

Asn Met Pro Val Phe Leu Gly Gly Thr Lys Gly Gly Gln Asp Ile Thr
130 135 140

Asp Phe Thr Met Gln Phe Val Ser Ser
145 150

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Lys Ser Ser Lys Met Gln Ala Phe Arg Ile Trp Asp Val Asn Gln Lys
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Thr Phe Tyr Leu Arg Asn Asn Gln Leu Val Ala Gly Tyr Leu Gln Gly
20 25 30

Pro Asn Val Asn Leu Glu Glu Lys Ile Asp Val Val Pro Ile Glu Pro
35 40 45

His Ala Leu Phe Leu Gly Ile His Gly Gly Lys Met Cys Leu Ser Cys
50 55 60

Val Lys Ser Gly Asp Glu Thr Arg Leu Gln Leu Glu Ala Val Asn Ile
65 70 75 80

Thr Asp Leu Ser Glu Asn Arg Lys Gln Asp Lys Arg Phe Ala Phe Ile
85 90 95

Arg Ser Asp Ser Gly Pro Thr Thr Ser Phe Glu Ser Ala Ala Cys Pro
100 105 110

Gly Trp Phe Leu Cys Thr Ala Met Glu Ala Asp Gln Pro Val Ser Leu
115 120 125

Thr Asn Met Pro Asp Glu Gly Val Met Val Thr Lys Phe Tyr Phe Gln
130 135 140

Glu Asp Glu
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<213> Mus musculus

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Asp Gln Val Leu Phe Val Asp Lys Arg Gln Pro Val Phe Glu Asp Met
20 25 30

Thr Asp Ile Asp Gln Ser Ala Ser Glu Pro Gln Thr Arg Leu Ile Ile
35 40 45

Tyr Met Tyr Lys Asp Ser Glu Val Arg Gly Leu Ala Val Thr Leu Ser
 50 55 60

Val Lys Asp Ser Lys Met Ser Thr Leu Ser Cys Lys Asn Lys Ile Ile
 65 70 75 80

Ser Phe Glu Glu Met Asp Pro Pro Glu Asn Ile Asp Asp Ile Gln Ser
 85 90 95

Asp Leu Ile Phe Phe Gln Lys Arg Val Pro Gly His Asn Lys Met Glu
 100 105 110

Phe Glu Ser Ser Leu Tyr Glu Gly His Phe Leu Ala Cys Gln Lys Glu
 115 120 125

Asp Asp Ala Phe Lys Leu Ile Leu Lys Lys Lys Asp Glu Asn Gly Asp
 130 135 140

Lys Ser Val Met Phe Thr Leu Thr Asn Leu His Gln Ser
 145 150 155

<210> 9
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Tyr Phe Gly Lys Leu Glu Ser Lys Leu Ser Val Ile Arg Asn Leu Asn
 1 5 10 15

Asp Gln Val Leu Phe Ile Asp Gln Gly Asn Arg Pro Leu Phe Glu Asp
 20 25 30

Met Thr Asp Ser Asp Cys Arg Asp Asn Ala Pro Arg Thr Ile Phe Ile
 35 40 45

Ile Ser Met Tyr Lys Asp Ser Gln Pro Arg Gly Met Ala Val Thr Ile
 50 55 60

Ser Val Lys Cys Glu Lys Ile Ser Thr Leu Ser Cys Glu Asn Lys Ile
 65 70 75 80

Ile Ser Phe Lys Glu Met Asn Pro Pro Asp Asn Ile Lys Asp Thr Lys
 85 90 95

Ser Asp Ile Ile Phe Phe Gln Arg Ser Val Pro Gly His Asp Asn Lys
 100 105 110

Met Gln Phe Glu Ser Ser Ser Tyr Glu Gly Tyr Phe Leu Ala Cys Glu
115 120 125

Lys Glu Arg Asp Leu Phe Lys Leu Ile Leu Lys Lys Glu Asp Glu Leu
130 135 140

Gly Asp Arg Ser Ile Met Phe Thr Val Gln Asn Glu Asp
145 150 155

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Glu Lys Glu Leu Arg Ala Ala Ser Pro Ser Leu Arg His Val Gln Asp
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Leu Ser Ser Arg Val Trp Ile Leu Gln Asn Asn Ile Leu Thr Ala Val
20 25 30

Pro Arg Lys Glu Gln Thr Val Pro Val Thr Ile Thr Leu Leu Pro Cys
35 40 45

Gln Tyr Leu Asp Thr Leu Glu Thr Asn Arg Gly Asp Pro Thr Tyr Met
50 55 60

Gly Val Gln Arg Pro Met Ser Cys Leu Phe Cys Thr Lys Asp Gly Glu
65 70 75 80

Gln Pro Val Leu Gln Leu Gly Glu Gly Asn Ile Met Glu Met Tyr Asn
85 90 95

Lys Lys Glu Pro Val Lys Ala Ser Leu Phe Tyr His Lys Lys Ser Gly
100 105 110

Thr Thr Ser Thr Phe Glu Ser Ala Ala Phe Pro Gly Trp Phe Ile Ala
115 120 125

Val Cys Ser Lys Gly Ser Cys Pro Leu Ile Leu Thr Gln Glu Leu Gly
130 135 140

Glu Ile Phe Ile Thr Asp Phe Glu Met Ile Val Val His
145 150 155

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 <213> Mus musculus

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Val Leu Ser Gly Ala Leu Cys Phe Arg Met Lys Asp Ser Ala Leu Lys
 1 5 10 15

Val Leu Tyr Leu His Asn Asn Gln Leu Leu Ala Gly Gly Leu His Ala
 20 25 30

Glu Lys Val Ile Lys Gly Glu Glu Ile Ser Val Val Pro Asn Arg Ala
 35 40 45

Leu Asp Ala Ser Leu Ser Pro Val Ile Leu Gly Val Gln Gly Gly Ser
 50 55 60

Gln Cys Leu Ser Cys Gly Thr Glu Lys Gly Pro Ile Leu Lys Leu Glu
 65 70 75 80

Pro Val Asn Ile Met Glu Leu Tyr Leu Gly Ala Lys Glu Ser Lys Ser
 85 90 95

Phe Thr Phe Tyr Arg Arg Asp Met Gly Leu Thr Ser Ser Phe Glu Ser
 100 105 110

Ala Ala Tyr Pro Gly Trp Phe Leu Cys Thr Ser Pro Glu Ala Asp Gln
 115 120 125

Pro Val Arg Leu Thr Gln Ile Pro Glu Asp Pro Ala Trp Asp Ala Pro
 130 135 140

Ile Thr Asp Phe Tyr Phe Gln Gln Cys Asp
 145 150

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| gtc aca gca gat gga tgc aag gac att ttt atg aaa aat gag ata ctt | | | | 96 |
| Val Thr Ala Asp Gly Cys Lys Asp Ile Phe Met Lys Asn Glu Ile Leu | 20 | 25 | 30 | |
| tca gca agc cag cct ttt gct ttt aat tgt aca ttc cct ccc ata aca | | | | 144 |
| Ser Ala Ser Gln Pro Phe Ala Phe Asn Cys Thr Phe Pro Pro Ile Thr | 35 | 40 | 45 | |
| tct ggg gaa gtc agt gta aca tgg tat aaa aat tct agc aaa atc cca | | | | 192 |
| Ser Gly Glu Val Ser Val Thr Trp Tyr Lys Asn Ser Ser Lys Ile Pro | 50 | 55 | 60 | |
| gtg tcc aaa atc ata cag tct aga att cac cag gac gag act tgg att | | | | 240 |
| Val Ser Lys Ile Ile Gln Ser Arg Ile His Gln Asp Glu Thr Trp Ile | 65 | 70 | 75 | 80 |
| ttg ttt ctc ccc atg gaa tgg ggg gac tca gga gtc tac caa tgt gtt | | | | 288 |
| Leu Phe Leu Pro Met Glu Trp Gly Asp Ser Gly Val Tyr Gln Cys Val | 85 | 90 | 95 | |
| ata aag ggt aga gac agc tgt cat aga ata cat gta aac cta act gtt | | | | 336 |
| Ile Lys Gly Arg Asp Ser Cys His Arg Ile His Val Asn Leu Thr Val | 100 | 105 | 110 | |
| ttt gaa aaa cat tgg tgt gac act tcc ata ggt ggt tta cca aat tta | | | | 384 |
| Phe Glu Lys His Trp Cys Asp Thr Ser Ile Gly Gly Leu Pro Asn Leu | 115 | 120 | 125 | |
| tca gat gag tac aag caa ata tta cat ctt gga aaa gat gat agt ctc | | | | 432 |
| Ser Asp Glu Tyr Lys Gln Ile Leu His Leu Gly Lys Asp Asp Ser Leu | 130 | 135 | 140 | |
| aca tgt cat ctg cac ttc ccg aag agt tgt gtt ttg ggt cca ata aag | | | | 480 |
| Thr Cys His Leu His Phe Pro Lys Ser Cys Val Leu Gly Pro Ile Lys | 145 | 150 | 155 | 160 |
| tgg tat aag gac tgt aac gag att aaa ggg gag cgg ttc act gtt ttg | | | | 528 |
| Trp Tyr Lys Asp Cys Asn Glu Ile Lys Gly Glu Arg Phe Thr Val Leu | 165 | 170 | 175 | |
| gaa acc agg ctt ttg gtg agc aat gtc tcg gca gag gac aga ggg aac | | | | 576 |
| Glu Thr Arg Leu Leu Val Ser Asn Val Ser Ala Glu Asp Arg Gly Asn | 180 | 185 | 190 | |
| tac gcg tgt caa gcc ata ctg aca cac tca ggg aag cag tac gag gtt | | | | 624 |
| Tyr Ala Cys Gln Ala Ile Leu Thr His Ser Gly Lys Gln Tyr Glu Val | 195 | 200 | 205 | |
| tta aat ggc atc act gtg agc att aca gaa aga gct gga tat gga gga | | | | 672 |
| Leu Asn Gly Ile Thr Val Ser Ile Thr Glu Arg Ala Gly Tyr Gly Gly | 210 | 215 | 220 | |
| agt gtc cct aaa atc att tat cca aaa aat cat tca att gaa gta cag | | | | 720 |
| Ser Val Pro Lys Ile Ile Tyr Pro Lys Asn His Ser Ile Glu Val Gln | 225 | 230 | 235 | 240 |
| ctt ggt acc act ctg att gtg gac tgc aat gta aca gac acc aag gat | | | | 768 |
| Leu Gly Thr Thr Leu Ile Val Asp Cys Asn Val Thr Asp Thr Lys Asp | 245 | 250 | 255 | |

| | |
|---|------|
| aat aca aat cta cga tgc tgg aga gtc aat aac act ttg gtg gat gat | 816 |
| Asn Thr Asn Leu Arg Cys Trp Arg Val Asn Asn Thr Leu Val Asp Asp | |
| 260 265 270 | |
| tac tat gat gaa tcc aaa cga atc aga gaa ggg gtg gaa acc cat gtc | 864 |
| Tyr Tyr Asp Glu Ser Lys Arg Ile Arg Glu Gly Val Glu Thr His Val | |
| 275 280 285 | |
| tct ttt cgg gaa cat aat ttg tac aca gta aac atc acc ttc ttg gaa | 912 |
| Ser Phe Arg Glu His Asn Leu Tyr Thr Val Asn Ile Thr Phe Leu Glu | |
| 290 295 300 | |
| gtg aaa atg gaa gat tat ggc ctt cct ttc atg tgc cac gct gga gtg | 960 |
| Val Lys Met Glu Asp Tyr Gly Leu Pro Phe Met Cys His Ala Gly Val | |
| 305 310 315 320 | |
| tcc aca gca tac att ata tta cag ctc cca gct ccg gat ttt cga gct | 1008 |
| Ser Thr Ala Tyr Ile Ile Leu Gln Leu Pro Ala Pro Asp Phe Arg Ala | |
| 325 330 335 | |
| tac ttg ata gga ggg ctt atc gcc ttg gtg gct gtg gct gtg tct gtt | 1056 |
| Tyr Leu Ile Gly Gly Leu Ile Ala Leu Val Ala Val Ala Val Ser Val | |
| 340 345 350 | |
| gtg tac ata tac aac att ttt aag atc gac att gtt ctt tgg tat cga | 1104 |
| Val Tyr Ile Tyr Asn Ile Phe Lys Ile Asp Ile Val Leu Trp Tyr Arg | |
| 355 360 365 | |
| agt gcc ttc cat tct aca gag acc ata gta gat ggg aag ctg tat gac | 1152 |
| Ser Ala Phe His Ser Thr Glu Thr Ile Val Asp Gly Lys Leu Tyr Asp | |
| 370 375 380 | |
| gcc tat gtc tta tac ccc aag ccc cac aag gaa agc cag agg cat gcc | 1200 |
| Ala Tyr Val Leu Tyr Pro Lys Pro His Lys Glu Ser Gln Arg His Ala | |
| 385 390 395 400 | |
| gtg gat gcc ctg gtg ttg aat atc ctg ccc gag gtg ttg gag aga caa | 1248 |
| Val Asp Ala Leu Val Leu Asn Ile Leu Pro Glu Val Leu Glu Arg Gln | |
| 405 410 415 | |
| tgt gga tat aag ttg ttt ata ttc ggc aga gat gaa ttc cct gga caa | 1296 |
| Cys Gly Tyr Lys Leu Phe Ile Phe Gly Arg Asp Glu Phe Pro Gly Gln | |
| 420 425 430 | |
| gcc gtg gcc aat gtc atc gat gaa aac gtt aag ctg tgc agg agg ctg | 1344 |
| Ala Val Ala Asn Val Ile Asp Glu Asn Val Lys Leu Cys Arg Arg Leu | |
| 435 440 445 | |
| att gtc att gtg gtc ccc gaa tcg ctg ggc ttt ggc ctg ttg aag aac | 1392 |
| Ile Val Ile Val Val Pro Glu Ser Leu Gly Phe Gly Leu Leu Lys Asn | |
| 450 455 460 | |
| ctg tca gaa gaa caa atc gcg gtc tac agt gcc ctg atc cag gac ggg | 1440 |
| Leu Ser Glu Glu Gln Ile Ala Val Tyr Ser Ala Leu Ile Gln Asp Gly | |
| 465 470 475 480 | |
| atg aag gtt att ctc att gag ctg gag aaa atc gag gac tac aca gtc | 1488 |
| Met Lys Val Ile Leu Ile Glu Leu Glu Lys Ile Glu Asp Tyr Thr Val | |
| 485 490 495 | |

| | |
|---|------|
| atg cca gag tca att cag tac atc aaa cag aag cat ggt gcc atc cgg | 1536 |
| Met Pro Glu Ser Ile Gln Tyr Ile Lys Gln Lys His Gly Ala Ile Arg | |
| 500 505 510 | |
| tgg cat ggg gac ttc acg gag cag tca cag tgt atg aag acc aag ttt | 1584 |
| Trp His Gly Asp Phe Thr Glu Gln Ser Gln Cys Met Lys Thr Lys Phe | |
| 515 520 525 | |
| tgg aag aca gtg aga tac cac atg ccg ccc aga agg tgt cgg ccg ttt | 1632 |
| Trp Lys Thr Val Arg Tyr His Met Pro Pro Arg Arg Cys Arg Pro Phe | |
| 530 535 540 | |
| ctc cgg tcc acg tgc cgc agc aca cac ctc tgt acc gca ccg cag gcc | 1680 |
| Leu Arg Ser Thr Cys Arg Ser Thr His Leu Cys Thr Ala Pro Gln Ala | |
| 545 550 555 560 | |
| cag aac tag | 1689 |
| Gln Asn | |

<210> 13
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<400> 13

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|---|--|
| Met Trp Ser Leu Leu Leu Cys Gly Leu Ser Ile Ala Leu Pro Leu Ser | |
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| Val Thr Ala Asp Gly Cys Lys Asp Ile Phe Met Lys Asn Glu Ile Leu | |
| 20 25 30 | |
| Ser Ala Ser Gln Pro Phe Ala Phe Asn Cys Thr Phe Pro Pro Ile Thr | |
| 35 40 45 | |
| Ser Gly Glu Val Ser Val Thr Trp Tyr Lys Asn Ser Ser Lys Ile Pro | |
| 50 55 60 | |
| Val Ser Lys Ile Ile Gln Ser Arg Ile His Gln Asp Glu Thr Trp Ile | |
| 65 70 75 80 | |
| Leu Phe Leu Pro Met Glu Trp Gly Asp Ser Gly Val Tyr Gln Cys Val | |
| 85 90 95 | |
| Ile Lys Gly Arg Asp Ser Cys His Arg Ile His Val Asn Leu Thr Val | |
| 100 105 110 | |
| Phe Glu Lys His Trp Cys Asp Thr Ser Ile Gly Gly Leu Pro Asn Leu | |
| 115 120 125 | |
| Ser Asp Glu Tyr Lys Gln Ile Leu His Leu Gly Lys Asp Asp Ser Leu | |

| | | | | |
|---|-----|-----|-----|---------|
| 130 | | 135 | | 140 |
| Thr Cys His Leu His Phe Pro Lys Ser Cys Val Leu Gly Pro Ile Lys | | | | |
| 145 | | 150 | | 155 160 |
| Trp Tyr Lys Asp Cys Asn Glu Ile Lys Gly Glu Arg Phe Thr Val Leu | | | | |
| | 165 | | 170 | 175 |
| Glu Thr Arg Leu Leu Val Ser Asn Val Ser Ala Glu Asp Arg Gly Asn | | | | |
| | 180 | | 185 | 190 |
| Tyr Ala Cys Gln Ala Ile Leu Thr His Ser Gly Lys Gln Tyr Glu Val | | | | |
| | 195 | | 200 | 205 |
| Leu Asn Gly Ile Thr Val Ser Ile Thr Glu Arg Ala Gly Tyr Gly Gly | | | | |
| | 210 | | 215 | 220 |
| Ser Val Pro Lys Ile Ile Tyr Pro Lys Asn His Ser Ile Glu Val Gln | | | | |
| 225 | | 230 | | 235 240 |
| Leu Gly Thr Thr Leu Ile Val Asp Cys Asn Val Thr Asp Thr Lys Asp | | | | |
| | 245 | | 250 | 255 |
| Asn Thr Asn Leu Arg Cys Trp Arg Val Asn Asn Thr Leu Val Asp Asp | | | | |
| | 260 | | 265 | 270 |
| Tyr Tyr Asp Glu Ser Lys Arg Ile Arg Glu Gly Val Glu Thr His Val | | | | |
| | 275 | | 280 | 285 |
| Ser Phe Arg Glu His Asn Leu Tyr Thr Val Asn Ile Thr Phe Leu Glu | | | | |
| | 290 | | 295 | 300 |
| Val Lys Met Glu Asp Tyr Gly Leu Pro Phe Met Cys His Ala Gly Val | | | | |
| 305 | | 310 | | 315 320 |
| Ser Thr Ala Tyr Ile Ile Leu Gln Leu Pro Ala Pro Asp Phe Arg Ala | | | | |
| | 325 | | 330 | 335 |
| Tyr Leu Ile Gly Gly Leu Ile Ala Leu Val Ala Val Ala Val Ser Val | | | | |
| | 340 | | 345 | 350 |
| Val Tyr Ile Tyr Asn Ile Phe Lys Ile Asp Ile Val Leu Trp Tyr Arg | | | | |
| | 355 | | 360 | 365 |
| Ser Ala Phe His Ser Thr Glu Thr Ile Val Asp Gly Lys Leu Tyr Asp | | | | |
| | 370 | | 375 | 380 |

Ala Tyr Val Leu Tyr Pro Lys Pro His Lys Glu Ser Gln Arg His Ala
385 390 395 400

Val Asp Ala Leu Val Leu Asn Ile Leu Pro Glu Val Leu Glu Arg Gln
405 410 415

Cys Gly Tyr Lys Leu Phe Ile Phe Gly Arg Asp Glu Phe Pro Gly Gln
420 425 430

Ala Val Ala Asn Val Ile Asp Glu Asn Val Lys Leu Cys Arg Arg Leu
435 440 445

Ile Val Ile Val Val Pro Glu Ser Leu Gly Phe Gly Leu Leu Lys Asn
450 455 460

Leu Ser Glu Glu Gln Ile Ala Val Tyr Ser Ala Leu Ile Gln Asp Gly
465 470 475 480

Met Lys Val Ile Leu Ile Glu Leu Glu Lys Ile Glu Asp Tyr Thr Val
485 490 495

Met Pro Glu Ser Ile Gln Tyr Ile Lys Gln Lys His Gly Ala Ile Arg
500 505 510

Trp His Gly Asp Phe Thr Glu Gln Ser Gln Cys Met Lys Thr Lys Phe
515 520 525

Trp Lys Thr Val Arg Tyr His Met Pro Pro Arg Arg Cys Arg Pro Phe
530 535 540

Leu Arg Ser Thr Cys Arg Ser Thr His Leu Cys Thr Ala Pro Gln Ala
545 550 555 560

Gln Asn

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| Met Gly Met Pro Pro Leu Leu Phe Cys Trp Val Ser Phe Val Leu Pro | |
| 1 5 10 15 | |
| ctt ttt gtg gca gca ggt aac tgt act gat gtc tat atg cac cat gag | 96 |
| Leu Phe Val Ala Ala Gly Asn Cys Thr Asp Val Tyr Met His His Glu | |
| 20 25 30 | |
| atg att tca gag ggc cag cct ttc ccc ttc aac tgc aca tac cct cca | 144 |
| Met Ile Ser Glu Gly Gln Pro Phe Pro Phe Asn Cys Thr Tyr Pro Pro | |
| 35 40 45 | |
| gta aca aac ggg gca gtg aat ctg aca tgg cat aga aca ccc agt aag | 192 |
| Val Thr Asn Gly Ala Val Asn Leu Thr Trp His Arg Thr Pro Ser Lys | |
| 50 55 60 | |
| agc cca atc tcc atc aac aga cac gtt aga att cac cag gac cag tcc | 240 |
| Ser Pro Ile Ser Ile Asn Arg His Val Arg Ile His Gln Asp Gln Ser | |
| 65 70 75 80 | |
| tgg att ttg ttt ctt ccg ttg gca ttg gag gac tca ggc atc tat caa | 288 |
| Trp Ile Leu Phe Leu Pro Leu Ala Leu Glu Asp Ser Gly Ile Tyr Gln | |
| 85 90 95 | |
| tgt gtt ata aag gat gcc cac agc tgt tac cga ata gct ata aac cta | 336 |
| Cys Val Ile Lys Asp Ala His Ser Cys Tyr Arg Ile Ala Ile Asn Leu | |
| 100 105 110 | |
| acc gtt ttt aga aaa cac tgg tgc gac tct tcc aac gaa gag agt tcc | 384 |
| Thr Val Phe Arg Lys His Trp Cys Asp Ser Ser Asn Glu Glu Ser Ser | |
| 115 120 125 | |
| ata aat tcc tca gat gag tac cag caa tgg tta ccc ata gga aaa tcg | 432 |
| Ile Asn Ser Ser Asp Glu Tyr Gln Gln Trp Leu Pro Ile Gly Lys Ser | |
| 130 135 140 | |
| ggc agt ctg acg tgc cat ctc tac ttc cca gag agc tgt gtt ttg gat | 480 |
| Gly Ser Leu Thr Cys His Leu Tyr Phe Pro Glu Ser Cys Val Leu Asp | |
| 145 150 155 160 | |
| tca ata aag tgg tat aag ggt tgt gaa gag att aaa gtg agc aag aag | 528 |
| Ser Ile Lys Trp Tyr Lys Gly Cys Glu Glu Ile Lys Val Ser Lys Lys | |
| 165 170 175 | |
| ttt tgc cct aca gga aca aag ctt ctt gtt aac aac atc gac gtg gag | 576 |
| Phe Cys Pro Thr Gly Thr Lys Leu Leu Val Asn Asn Ile Asp Val Glu | |
| 180 185 190 | |
| gat agt ggg agc tat gca tgc tca gcc aga ctg aca cac ttg ggg aga | 624 |
| Asp Ser Gly Ser Tyr Ala Cys Ser Ala Arg Leu Thr His Leu Gly Arg | |
| 195 200 205 | |
| atc ttc acg gtt aga aac tac att gct gtg aat acc aag gaa gtt ggg | 672 |
| Ile Phe Thr Val Arg Asn Tyr Ile Ala Val Asn Thr Lys Glu Val Gly | |
| 210 215 220 | |
| tct gga gga agg atc cct aac atc acg tat cca aaa aac aac tcc att | 720 |
| Ser Gly Gly Arg Ile Pro Asn Ile Thr Tyr Pro Lys Asn Asn Ser Ile | |
| 225 230 235 240 | |

| | |
|---|------|
| gaa gtt caa ctt ggc tcc acc ctc att gtg gac tgc aat ata aca gac | 768 |
| Glu Val Gln Leu Gly Ser Thr Leu Ile Val Asp Cys Asn Ile Thr Asp | |
| 245 250 255 | |
| acg aag gag aat acg aac ctc aga tgc tgg cga gtt aac aac acc ctg | 816 |
| Thr Lys Glu Asn Thr Asn Leu Arg Cys Trp Arg Val Asn Asn Thr Leu | |
| 260 265 270 | |
| gtg gac gat tac tac aac gac ttc aaa cgc atc cag gaa gga atc gaa | 864 |
| Val Asp Asp Tyr Tyr Asn Asp Phe Lys Arg Ile Gln Glu Gly Ile Glu | |
| 275 280 285 | |
| acc aat ctg tct ctg agg aat cac att ctg tac aca gtg aac ata aca | 912 |
| Thr Asn Leu Ser Leu Arg Asn His Ile Leu Tyr Thr Val Asn Ile Thr | |
| 290 295 300 | |
| ttc tta gaa gtg aaa atg gag gac tac ggc cat cct ttc aca tgc cac | 960 |
| Phe Leu Glu Val Lys Met Glu Asp Tyr Gly His Pro Phe Thr Cys His | |
| 305 310 315 320 | |
| gct gcg gtg tcc gca gcc tac atc att ctg aaa cgc cca gct cca gac | 1008 |
| Ala Ala Val Ser Ala Ala Tyr Ile Ile Leu Lys Arg Pro Ala Pro Asp | |
| 325 330 335 | |
| ttc cgg gct tac ctc ata gga ggt ctc atg gct ttc cta ctt ctg gcc | 1056 |
| Phe Arg Ala Tyr Leu Ile Gly Gly Leu Met Ala Phe Leu Leu Leu Ala | |
| 340 345 350 | |
| gtg tcc att ctg tac atc tac aac acc ttt aag gtc gac atc gtg ctt | 1104 |
| Val Ser Ile Leu Tyr Ile Tyr Asn Thr Phe Lys Val Asp Ile Val Leu | |
| 355 360 365 | |
| tgg tat agg agt acc ttc cac act gcc cag gct cca gat gac gag aag | 1152 |
| Trp Tyr Arg Ser Thr Phe His Thr Ala Gln Ala Pro Asp Asp Glu Lys | |
| 370 375 380 | |
| ctg tat gat gcc tat gtc tta tac ccc aag tac cca aga gaa agc cag | 1200 |
| Leu Tyr Asp Ala Tyr Val Leu Tyr Pro Lys Tyr Pro Arg Glu Ser Gln | |
| 385 390 395 400 | |
| ggc cat gat gtg gac aca ctg gtg ttg aag atc ttg ccc gag gtg ctg | 1248 |
| Gly His Asp Val Asp Thr Leu Val Leu Lys Ile Leu Pro Glu Val Leu | |
| 405 410 415 | |
| gag aaa cag tgt gga tat aag tta ttc ata ttt ggc agg gat gaa ttc | 1296 |
| Glu Lys Gln Cys Gly Tyr Lys Leu Phe Ile Phe Gly Arg Asp Glu Phe | |
| 420 425 430 | |
| cct gga caa gct gtg gcc agc gtc att gat gaa aac att aag ctg tgt | 1344 |
| Pro Gly Gln Ala Val Ala Ser Val Ile Asp Glu Asn Ile Lys Leu Cys | |
| 435 440 445 | |
| agg agg ctg atg gtc ctc gtg gca cca gag aca tcc agc ttc agc ttt | 1392 |
| Arg Arg Leu Met Val Leu Val Ala Pro Glu Thr Ser Ser Phe Ser Phe | |
| 450 455 460 | |
| ctg aag aac ttg act gaa gaa caa atc gct gtc tac aat gcc ctc gtc | 1440 |
| Leu Lys Asn Leu Thr Glu Glu Gln Ile Ala Val Tyr Asn Ala Leu Val | |
| 465 470 475 480 | |
| cag gac ggc atg aag gtc att ctg att gaa ctg gag aga gtc aag gac | 1488 |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Gln | Asp | Gly | Met | Lys | Val | Ile | Leu | Ile | Glu | Leu | Glu | Arg | Val | Lys | Asp | |
| | | | | 485 | | | | | 490 | | | | | 495 | | |
| tac | agc | acc | atg | ccc | gag | tcc | att | cag | tac | atc | cga | cag | aag | cac | ggg | 1536 |
| Tyr | Ser | Thr | Met | Pro | Glu | Ser | Ile | Gln | Tyr | Ile | Arg | Gln | Lys | His | Gly | |
| | | | 500 | | | | | 505 | | | | | 510 | | | |
| gcc | atc | cag | tgg | gat | ggg | gac | ttc | aca | gag | cag | gca | cag | tgc | gcc | aag | 1584 |
| Ala | Ile | Gln | Trp | Asp | Gly | Asp | Phe | Thr | Glu | Gln | Ala | Gln | Cys | Ala | Lys | |
| | | 515 | | | | | 520 | | | | | 525 | | | | |
| acg | aaa | ttc | tgg | aag | aaa | gtg | aga | tat | cat | atg | cca | ccc | agg | agg | tac | 1632 |
| Thr | Lys | Phe | Trp | Lys | Lys | Val | Arg | Tyr | His | Met | Pro | Pro | Arg | Arg | Tyr | |
| | 530 | | | | | 535 | | | | | 540 | | | | | |
| ccg | gca | tct | ccc | ccc | gtc | cag | ctg | cta | gga | cac | aca | ccc | cgc | ata | cca | 1680 |
| Pro | Ala | Ser | Pro | Pro | Val | Gln | Leu | Leu | Gly | His | Thr | Pro | Arg | Ile | Pro | |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 | |
| ggc | tag | | | | | | | | | | | | | | | 1686 |
| Gly | | | | | | | | | | | | | | | | |

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 <211> 561
 <212> PRT
 <213> Rattus sp.

<400> 15

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| Met | Gly | Met | Pro | Pro | Leu | Leu | Phe | Cys | Trp | Val | Ser | Phe | Val | Leu | Pro | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| Leu | Phe | Val | Ala | Ala | Gly | Asn | Cys | Thr | Asp | Val | Tyr | Met | His | His | Glu | |
| | | 20 | | | | | | 25 | | | | | 30 | | | |
| Met | Ile | Ser | Glu | Gly | Gln | Pro | Phe | Pro | Phe | Asn | Cys | Thr | Tyr | Pro | Pro | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Val | Thr | Asn | Gly | Ala | Val | Asn | Leu | Thr | Trp | His | Arg | Thr | Pro | Ser | Lys | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| Ser | Pro | Ile | Ser | Ile | Asn | Arg | His | Val | Arg | Ile | His | Gln | Asp | Gln | Ser | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Trp | Ile | Leu | Phe | Leu | Pro | Leu | Ala | Leu | Glu | Asp | Ser | Gly | Ile | Tyr | Gln | |
| | | | 85 | | | | | | 90 | | | | | 95 | | |
| Cys | Val | Ile | Lys | Asp | Ala | His | Ser | Cys | Tyr | Arg | Ile | Ala | Ile | Asn | Leu | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Thr | Val | Phe | Arg | Lys | His | Trp | Cys | Asp | Ser | Ser | Asn | Glu | Glu | Ser | Ser | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |

Ile Asn Ser Ser Asp Glu Tyr Gln Gln Trp Leu Pro Ile Gly Lys Ser
130 135 140

Gly Ser Leu Thr Cys His Leu Tyr Phe Pro Glu Ser Cys Val Leu Asp
145 150 155 160

Ser Ile Lys Trp Tyr Lys Gly Cys Glu Glu Ile Lys Val Ser Lys Lys
165 170 175

Phe Cys Pro Thr Gly Thr Lys Leu Leu Val Asn Asn Ile Asp Val Glu
180 185 190

Asp Ser Gly Ser Tyr Ala Cys Ser Ala Arg Leu Thr His Leu Gly Arg
195 200 205

Ile Phe Thr Val Arg Asn Tyr Ile Ala Val Asn Thr Lys Glu Val Gly
210 215 220

Ser Gly Gly Arg Ile Pro Asn Ile Thr Tyr Pro Lys Asn Asn Ser Ile
225 230 235 240

Glu Val Gln Leu Gly Ser Thr Leu Ile Val Asp Cys Asn Ile Thr Asp
245 250 255

Thr Lys Glu Asn Thr Asn Leu Arg Cys Trp Arg Val Asn Asn Thr Leu
260 265 270

Val Asp Asp Tyr Tyr Asn Asp Phe Lys Arg Ile Gln Glu Gly Ile Glu
275 280 285

Thr Asn Leu Ser Leu Arg Asn His Ile Leu Tyr Thr Val Asn Ile Thr
290 295 300

Phe Leu Glu Val Lys Met Glu Asp Tyr Gly His Pro Phe Thr Cys His
305 310 315 320

Ala Ala Val Ser Ala Ala Tyr Ile Ile Leu Lys Arg Pro Ala Pro Asp
325 330 335

Phe Arg Ala Tyr Leu Ile Gly Gly Leu Met Ala Phe Leu Leu Leu Ala
340 345 350

Val Ser Ile Leu Tyr Ile Tyr Asn Thr Phe Lys Val Asp Ile Val Leu
355 360 365

Trp Tyr Arg Ser Thr Phe His Thr Ala Gln Ala Pro Asp Asp Glu Lys
370 375 380

Leu Tyr Asp Ala Tyr Val Leu Tyr Pro Lys Tyr Pro Arg Glu Ser Gln
385 390 395 400

Gly His Asp Val Asp Thr Leu Val Leu Lys Ile Leu Pro Glu Val Leu
405 410 415

Glu Lys Gln Cys Gly Tyr Lys Leu Phe Ile Phe Gly Arg Asp Glu Phe
420 425 430

Pro Gly Gln Ala Val Ala Ser Val Ile Asp Glu Asn Ile Lys Leu Cys
435 440 445

Arg Arg Leu Met Val Leu Val Ala Pro Glu Thr Ser Ser Phe Ser Phe
450 455 460

Leu Lys Asn Leu Thr Glu Glu Gln Ile Ala Val Tyr Asn Ala Leu Val
465 470 475 480

Gln Asp Gly Met Lys Val Ile Leu Ile Glu Leu Glu Arg Val Lys Asp
485 490 495

Tyr Ser Thr Met Pro Glu Ser Ile Gln Tyr Ile Arg Gln Lys His Gly
500 505 510

Ala Ile Gln Trp Asp Gly Asp Phe Thr Glu Gln Ala Gln Cys Ala Lys
515 520 525

Thr Lys Phe Trp Lys Lys Val Arg Tyr His Met Pro Pro Arg Arg Tyr
530 535 540

Pro Ala Ser Pro Pro Val Gln Leu Leu Gly His Thr Pro Arg Ile Pro
545 550 555 560

Gly